MODIS SCIENCE TEAM MEMBER
Semi-Annual Report (September - December 1993)

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Contract #: NAS5 31365

a) Task Objectives

The objectives of this phase of the project were: to continue the research program developing the 'at-launch' algorithms for MODIS atmospheric correction, vegetation indices, fire detection and land cover and to build the infrastructure and collaboration to permit the research to be undertaken. The project has developed a number of collaborative projects which are intended to expand the scope of the team members activities and involve a larger community in the MODIS research. Due to the small number of researchers addressing the issues necessary for the methodological advances needed for MODIS, emphasis has been given to developing international collaborative research through the IGBP Data and Information System Core Project. In addition, the goals of the MODIS project, the status of the instrument and preliminary results of the research were presented at key scientific meetings. The project was also represented at the MODIS Team meeting. Results of the studies undertaken as part of the project are in the process of being written up and submitted for publication.

b) Tasks Accomplished (Data analysis and interpretation).

Specifically the project has addressed the following topics over the last four months:

- **MODIS Atmospheric Correction**

- The Atmospheric Correction ATBD was refined ready for the peer review process. Discussion with various scientists shows the approach taken as to be the best currently available. Presentations on the validation studies performed with AVHRR

were given at LOA (D. Tanre, Laboratory in France) and were well received.
- 6S code: the beta test of the 6S Code has been active and a lot of bugs and imperfections have been found in the code. The official release of version 3.0 is fixed for the 15th February, an announcement was been made at the 6th ISPRS Congress, collaboration on the use and improvment of 6S has been initiated with several institutions.
- MAS SCAR-A: The NOAA11-AVHRR images have been analyzed and validated and the results of the atmospheric correction are very good. Informal presentation of the results has been made and a paper on this topic will be published in a special issue on SCAR. All SCAR-A/ MAS calibrated data are expected by mid-February.
- Sunphotometer network: work has been underway on the development of a proposal to expand the collaboration with the LTER sites concerning atmospheric correction. If funded the LTER/NASA collaboration will be formalized in a two year research activity. This collaboration (cf. July Report) is an important part of the atmospheric correction validation exercise.
- Aerosol retrieval: a formula to compute the reflectance in AVHRR-channel 3 (3.75 microns) has been defined using thermal channels. Validation has been done both over sea and over land using sunglint and FIFE-87 measurements. Some preliminary applications of this reflectance code have been performed: Studies of surface properties retrieval, aerosol retrieval over land and sunglint, and desert aerosol retrieval are underway. A next step will be the analysis of SCAR - MAS middle infrared data using a similar technique.

•MODIS Land Cover

- Discussions were held with Dr R. Scholes (Forestek) concerning the development of land cover test sites associated with the IGBP GCTE megatransect in Southern Africa.
- Discussions were held with the Landsat Pathfinder Working Group concerning the Global Land Cover Test Site initiative. A meeting is planned for February to finalise the implentation plan for this activity.
- Discussions were held with Tom Loveland EDC concerning the development of the IGBP Gloabl Land Cover data base which

would be the pre-launch /at-launch version of the MODIS Land Cover product to be used by the various MODIS products.

• MODIS Fire Detection

- A demonstration study is underway to calibrate the AVHRR active fire detection algorithm. Landsat MSS data are being used to correlate active fires with burned area.
- Discussions were held with the ECE concerning collaboration with the new FIRE initiative in CAR.

• MODIS Vegetation Index

- Preliminary discussions have been held concerning access to SeaWifs data for analysing improved indeces e.g. SARVI.

c) Data / Analysis / Interpretation

AVHRR GAC data (GIMMS), LAC data (EDC/South Africa) and subsets of the IGBP Global Data Set were analyzed during the reporting period.

MAS SCAR data were analyzed.

Sunphotometer data continued to be collected at GSFC and for a number of remote sites. Analysis is continuing. Network was tested in Brazil in preparation for the SCAR B campaign.

Landsat data were obtained through the EDC MODIS test site initiative. Landsat TM data were acquired through the EOSAT NASA data grant.

Meetings Attended.

- ECE TREES Conference and FIRE Conference
- EDC DAAC Science Advisory Panel
- ISPRS: Spectral Signature in Remote Sensing
- Eurocourse: Two chapters (atmospheric correction/calibration) of a book "Advances in the use of AVHRR data for land applications" have been written and presented during the EUROCOURSE lecture series on AVHRR analysis (22-26 Nov).
- EOSDIS Data Panel Review (December).
- SWAMP meeting (November)

d) Anticipated Future Actions.

Research:

Review the BRDF- VI- Atmospheric Correction interactions - meeting planned for January.
Develop proposal for the NSF LTER Atmospheric Correction study- Submit February.
Plan collaboration with the Landsat Pathfinder GLCTest site initiative.
Work to obtain access to the global 1km test site data from the LP DAAC (Visit EDC February).
Continued AVHRR Fire algorithm study.
Continued AVHRR Land Cover study.
Final refinements to the Vegetation Index ATBD.
Continued MODIS Airborne Simulator (MAS) analysis - planning for California SCAR.

Upcoming Meetings:
Val d'Isere Spectral Signatures Meeting (Jan 94)
EDC DAAC Meeting (Oct 93)
SWAMP Meeting (Nov 93)
MODIS VI Meeting (Jan94)

Hardware Purchase

• No new equipment purchased

e) Problems/Corrective Actions

Nothing to report

f) New Papers

- Three papers were presented at ISPRS:
Correction method for the NDVI after the Mt. Pinatubo eruption, Computation and use of AVHRR 3.75 micron channel, Sunphotometer network measurements of aerosol properties and will be submited for publication in the special issue of R.S.E or Remote Sensing Reviews.
- Two chapters have been submitted to "Advances in the use of AVHRR data for land applications".